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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/404,570 09/23/99 MALHOTRA

S D/99531

EXAMINER

IM22/0504

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ART UNIT

PAPER NUMBER

1714

DATE MAILED:

05/04/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/404,570

Applicant(s)

Malhotra et al.

Examiner

Calle Shosho

Group Art Unit

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☐ Responsive to communication(s) filed on _____

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

☒ Claim(s) 1-20 is/are pending in the application

Of the above, claim(s) _____ is/are withdrawn from consideration

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-20 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☒ None of the CERTIFIED copies of the priority documents have been
☐ received.

☐ received in Application No. (Series Code/Serial Number) _____

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 2

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

— SEE OFFICE ACTION ON THE FOLLOWING PAGES —

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DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

It is preferred that application numbers are used in place of the attorney docket numbers on page 14, lines 7 and 42, page 15, lines 12 and 19, and page 16, lines 4 and 14 in order that the examiner is able to examine the referenced applications and properly determine the patentable lines of demarcation.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1-5, 8-13, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malhotra et al. (U.S. 5,931,995) in view of Siddiqui (U.S. 5,939,468) and Watt (U.S. 4,105,806).

Malhotra et al. discloses a hot melt ink possessing melting temperature of 125⁰-160⁰ C, melt viscosity of 5-20 cP, and acoustic-loss value of less than 100 dB/mm. The ink contains colorant such as a dye or pigment, 0.5-10% antioxidant, and UV absorber. There is also disclosed an acoustic ink jet printing process (col.2, lines 11-13, col.3, lines 9-15 and 31-32, col.4, line 14, col.6, lines 8-9, col.9, lines 60-62, and col.11, line 59-col.12, line 34).

There is also disclosed the use of 1-55% compounds such as benzaldehyde, 3-methoxy benzaldehyde, 4-methoxy benzaldehyde, 3-methyl benzaldehyde, 2-hydroxy benzaldehyde, cinnamaldehyde, and 5-97% compounds such as 2,3,4-trimethoxybenzaldehyde, 3,5-dimethoxy benzaldehyde, 2,5-dimethoxy benzaldehyde, and 3-benzyloxy benzaldehyde (col.6, lines 1-6, col.7, lines 1, 5-6, 8, 17, and 19 and col.8, lines 11-14 and 17).

It is noted that Malhotra et al. discloses 2,3,4-trimethoxybenzaldehyde, 2-hydroxy benzaldehyde, and 3-benzyloxy benzaldehyde, while the present claims require either 2,3,5-trimethoxybenzaldehyde, 2,3,6-trimethoxybenzaldehyde, 2,4,5-trimethoxybenzaldehyde, 2,4,6-trimethoxybenzaldehyde, 3-hydroxy benzaldehyde, 4-hydroxy benzaldehyde, or 4-benzyloxy

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benzaldehyde. In each case, the only difference between the reference compounds and those presently claimed are the position of the substituents, i.e. ortho, meta, or para. However, absent any evidence of criticality, one of ordinary skill in the art would expect the benzaldehyde to function in the same manner regardless of the position of the substituents. Further Malhotra et al. broadly disclose the use of benzaldehydes or, for instance, 3-methoxy benzaldehyde, while the present claims require more specific types of benzaldehydes such as 4-hydroxy-3-methoxy benzaldehyde. However, one of ordinary skill in the art would have recognized that the broad disclosure of benzaldehyde or 3-methoxy benzaldehyde encompasses the use of specific types of these compounds such as those presently claimed, and that the choice of these specific types of compounds would have been within the bounds of routine experimentation.

The difference between Malhotra et al. and the present claimed invention is the requirement in the claims of (a) viscosity modifier, (b) aldehyde copolymer, and (c) time necessary for ink to change from solid to liquid.

With respect to difference (a), Malhotra et al. discloses benzaldehyde compounds as presently claimed, but does not explicitly refer to these compounds as viscosity modifiers. However, given that the reference compounds are the same type as the compounds presently claimed, i.e. benzaldehydes, it would have been natural for one of ordinary skill in the art to infer that the reference compounds intrinsically function as viscosity modifiers, and thereby arrive at the claimed invention.

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With respect to difference (b), Siddiqui, which is drawn to ink jet inks, discloses the use of 12-35% toluenesulfonamide-formaldehyde resin in order to improve the adhesion of the ink to the substrate (col.7, lines 66-col.8, line 2, col.8, lines 57-62, and col.9, lines 53-60).

Watt, which is drawn to ink compositions, discloses the use of polyglycidyl ethers of formaldehyde as a binder (col.3, lines 52-54 and col.4, lines 10-12).

In light of the motivation for using aldehyde copolymers discloses by Siddiqui and Watt as described above, it therefore would have been obvious to one of ordinary skill in the art to use these copolymers in the ink composition of Malhotra et al. in order to produce an ink with improved adhesion to the substrate, and thereby arrive at the claimed invention.

With respect to difference (c), although there is no explicit disclosure of the time required to change the ink from a solid state to a liquid state, given that the melting temperature of Malhotra et al.'s ink overlaps the melting temperature presently claimed, it is natural to infer that Malhotra et al.'s ink will intrinsically change from solid to liquid in the same amount of time as presently claimed.

4. Claims 6 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malhotra et al. in view of Siddiqui and Watt as applied to claims 1-5, 8-13, and 17-20 above, and further in view of Tobias et al. (U.S. 5,286,288).

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The difference between over Malhotra et al. in view of Siddiqui and Watt and the present claimed invention is the requirement in the claims of conductivity and the amount of conductivity enhancing agent.

Tobias et al., which is drawn to hot melt inks, discloses the use of 0.1-5% conductivity agents in order to control the conductivity of the ink from 500-1500 microsiemens/cm or approximately 8.7-9.2 log(picomho/cm) which ensures that the ink has sufficient conductivity in order to be successfully ink jet printed (col.3, line 19, lines 29-30 and 35-37).

In light of the above, it therefore would have been obvious to one of ordinary skill in the art to control the conductivity of the hot melt of Malhotra et al. via conductivity agents in order to produce an suitable for ink jet printing, and thereby arrive at the claimed invention.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malhotra et al. in view of Siddiqui and Watt as applied to claims 1-5, 8-13, and 17-20 above, and further in view of Nishizaki et al. (U.S. 6,022,910).

The difference between over Malhotra et al. in view of Siddiqui and Watt and the present claimed invention is the requirement in the claims of the haze value of the ink.

On the one hand, given that Malhotra et al. in view of Siddiqui and Watt disclose an ink with similar ingredients to those presently claimed, i.e. aldehyde copolymer, nonpolymeric aldehyde, colorant, antioxidant, and UV absorber, it is natural to infer that the ink intrinsically possesses haze value as presently claimed.

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On the other hand, Nishizaki et al., which is drawn to hot melt inks, discloses that hot melt inks having haze value of 0-30 exhibit superior light transmission properties especially when printed on OHP sheets (col.3, lines 20-25).

In light of the disclosure of Nishizaki et al., it therefore would have been within the skill level of one of ordinary skill in the art to vary the specific types and amounts of ingredients present in the ink of Malhotra et al. in order to produce an ink having haze value of 0-30 in order to produce an ink with superior light transmission properties, and thereby arrive at the claimed invention.

6. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malhotra et al. in view of Siddiqui and Watt as applied to claims 1-5, 8-13, and 17-20 above, and further in view of Shacklette (U.S. 5,378,403) and WO 93/22775.

The difference between over Malhotra et al. in view of Siddiqui and Watt and the present claimed invention is the requirement in the claims of specific type of conductivity enhancing agent.

Shacklette discloses the use of polyaniline complexes with phosphonic or phosphinic acid in order to impart conductivity and enhanced thermal stability to polymers including formaldehyde-sulfonamide (col.3, lines 45 and 66-68, col.9, lines 39-41, col.10, lines 1 and 3, col.12, lines 30-38, col.13, line 9, and col.18, lines 40-42). Although there is no explicit disclosure that the complex is suitable for use in inks, it is well known in the art as found in

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state-of-the-art references such as WO 93/22775 (page 17, lines 25-26) that these polyaniline-phosphorous-containing acid complexes are indeed suitable for use in inks.

In light of the motivation for using specific type of conductivity enhancing agent disclosed by Shacklette and WO 93/22775 as described above, it therefore would have been obvious to one of ordinary skill in the art to use this conductivity enhancing agent in the ink of Malhotra et al. in order to control the conductivity of the ink so that the ink is successfully ink jet printed, and thereby arrive at the claimed invention.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Breton et al. (U.S. 6,045,607) discloses hot melt inks containing antioxidant, UV absorber, and colorant.

Yang (U.S. 5,825,391) discloses an ink jet ink containing toluenesulfonamide-formaldehyde plasticizer.

Yaegashi et al. (U.S. 5,270,730) and Wickramanayake et al. (U.S. 5,713,989) disclose inks containing benzaldehydes.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Callie Shosho whose telephone number is (703) 305-0208. The examiner

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can normally be reached on Mondays-Thursdays from 7:00 am to 4:30 pm. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan, can be reached on (703) 306-2777. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3599.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

C. S.

Callie Shosho

5/2/00

Vasu Jagannathan
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